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REMARKS AND PROOFS

OF

SIBBALD'S PATENT ANTI-CORROSIVE

"METALLINE COMPOUND,"

FOR THE

PRESERVATION OF STEAM BOILERS

FROM

SCALE, INCRUSTATION, CORROSION, &c.,

AND

FOR INCREASING AND EXTENDING THE DURABILITY OF  
THE METALLIC FASTENINGS AND TIM-  
BERS OF VESSELS, &c.

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## SIBBALD'S PATENT "METALLINE COMPOUND."

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THE UNDERSIGNED, Charles F. Sibbald, of the city of Philadelphia, having obtained letters patent in the United States, Great Britain, France, &c., for what he has called an anti-corrosive "Metalline Compound" for the preservation of steam-boilers, and also for increasing and extending the durability of the metallic fastenings and timbers of vessels, would submit the following:

The steam-engine is the most powerful and effective agent that the ingenuity of man ever produced, exerting the most extraordinary influences in the affairs of nations, as well as those of individuals. Nevertheless there are most serious and well known difficulties attending its use, while it is also subject to enormous expense. To remedy these evils and the continued disasters which are almost daily recorded, has been a subject of earnest consideration of scientific and other persons, for a long elapse of time; and if the steam-engine can be divested of these difficulties as hereinafter proposed, much will be accomplished in removing some of the most formidable barriers to the use of this great and gigantic power, so simple in its construction, so simple in its operation, and so illimitable and unbounded in the purposes to which it is applicable.

With the vast and diversified applications of steam, and co-extensive with it in importance, is the commercial marine of the world, estimated, at least, at ten millions of tons burden, and which at fifty dollars per ton would reach the enormous sum of five hundred millions of dollars. Of this at least seven millions of tons are owned, in about equal proportions, by the United States and Great Britain. The average duration of vessels does not probably extend beyond ten years. At least two vessels a day are lost by shipwreck; and if these vessels can be preserved in their timbers and fastenings, and their duration extended, even for a limited period of time, a matter of vast importance will be attained. And if the expense of the steam-engine shall be reduced by the simple application as hereinafter proposed, there is no doubt that steam will be extensively applied as an auxiliary to sails, that many a shipwreck will thereby be avoided, independently of cases of abandonment, shipwreck, and total loss produced by defective fastenings and defective timbers, which it is designed to lessen by the application herein mentioned.

One of the most serious difficulties attending the use of the steam-engine is the rapid destruction of the boiler. This destruction is attributable to three causes:

First. The adhesion of scale, incrustation, or other deposite.

Second. Corrosion or rust, or oxidation.

Third. Excessive fire heat.

These, indeed, comprehend the principal causes of destruction and expense, if they are not in fact the primary or principal causes of explosion and the dreadful destruction of human life, in the continued disasters which follow each other in such rapid succession.



*First.* It is well known that the calcareous, or other deposit from the evaporation of nearly all water, forms a stony incrustation or scale, which adheres and attaches itself firmly to the interior of the boiler's surface. Hitherto this incrustation has been partially removed by the very tedious, expensive, and destructive use of chisels and picks, or other violent means, most injurious to the boiler, and often taking with it a portion of the metal. This incrustation also acts as a non-conductor of heat, retards the making of steam, causes the burning or weakening of the boiler plates, loss of power of the engine, waste of fuel, and particularly tending to retard the passage of ocean steamers, upon the boilers of which it often becomes so completely incorporated and cemented, with the oxidation, or corrosion of the metal, that it is frequently found to be as firmly attached as if it was welded to the boiler, and in the words of the celebrated Dr. Lardner, "the crust thus formed, is not unfrequently an inch or more in thickness, and so hard that good chisels are often broken in removing it," besides which it sometimes chokes or even fills up the tubes of marine boilers so completely, that no water whatever can pass through them, and when the fire passes through the tubes, sometimes a solid mass of incrustation forms between them, and upon the water spaces adjoining the furnace or fire-box; in either case the destruction of the tube is inevitable; moreover the incrustation on the boiler surface leads to other and still more serious consequences, it is liable to be suddenly cracked or rent, and to be thrown off by the expansion or contraction of the boiler, or to become detached from it by other causes; in such case the water is instantly thrown upon the red-hot surface, from whence this incrustation had excluded it from the metal, instantly forming accumulated steam of such extent, that it cannot be restrained, and explosion must necessarily follow.

*Secondly.* The corrosion of the boiler, and its immediate or gradual reduction, is another evil which is almost general in its operation, the moment the water is let into the boiler, whether fresh or salt, it commences the work of destruction upon its surface; hence, according to the quality of the water used, and the quality of the iron, the boiler goes either by gradual reduction, or rapidly, in flakes or scales—frequently in a brief space of time becomes a mere shell in thickness, and thus reduced, *explosion* follows explosion in rapid succession, and the dreadful loss of human life, as has been so repeatedly witnessed from this cause; and which no doubt is in reality the most general cause of explosion. For this destruction of the boiler by corrosion, so fatal in its consequences, hitherto no remedy has been produced, and thus from these combined causes, the boiler from its first start is working its own destruction.

*Thirdly.* The reduction of the boiler from the action of the fire upon its surface, and the flues and tubes, especially where scale or incrustation forms, and reducing and weakening the metal, is another cause of destruction, which most earnestly calls for a remedy. These may be said to constitute the great difficulties in the use of the steam-engine, or the greatest barriers to its employment, and which the undersigned proposes to obviate—that is to say, to apply a remedy for the general preservation of the boiler from the adhesion of scale or incrustation, to arrest its corrosion or oxidation, and also, as far as possible, to protect it from the effects of excessive fire heat.

It is well established that the average duration of marine boilers does not extend beyond three years; and it may well be questioned, whether the



average duration of boilers in general, in constant use, extends to even that period of time, without extensive repairs. A set of copper boilers for two of the naval steamers of the United States (the Mississippi and Missouri) cost two hundred thousand dollars each. The general cost of the boilers is nearly one-half of that of the engine and other parts of the machinery, where even iron boilers are used; hence, in view of this rapid destruction, the great expense of the steam-engine, the difficulty of attending its use, and the liability of explosion. Incrustation and corrosion, combining the principal causes of this destruction, and the disastrous consequences here enumerated. But that other causes also exist in the use of the steam-engine, to call for the utmost vigilance of those in whose care they are confided, is too well understood to require either comment or explanation.

*The corrosion of the metallic fastenings of ships or vessels*, and particularly the action of the iron upon the wood, and the acid of the wood upon the iron, has been, from time immemorial, another most serious and well established evil, causing the premature decay and destruction of the vessel—as an illustration of which, let it be supposed, for instance, that a ship is stranded, on Long Island or elsewhere, her fastenings have become defective, or “iron sick,” her timbers defective from this cause—the ship consequently goes immediately to pieces. The ship is lost; the cargo lost; the crew, and perhaps several hundred passengers perish. Whereas if the fastenings and timbers *were yet firm*, the whole might be saved. The same principles will apply to cases of abandonment at sea, from the same causes; and a most serious question is here presented, where so vast an amount of property and human life is involved, in the proposition of a remedy, in this as well as the other equally extended interests connected with the steam-engine.

In view of which the undersigned has given these subjects his most earnest and most deliberate consideration; has expended vast sums of money in the practical use of the steam-engine; and other extensive interests in ship-building; and after twelve years of research and experiment, and from the tests made by the Navy Department of the United States, and otherwise, as herewith shown, he founds the belief that his labors have been crowned with success, so far as to produce a remedy, coming within the means of every one; which, as regards the use of the steam-engine, promises (in the preservation of the boiler) to save perhaps one-half of its expense: to lessen the danger of explosion; and as regards the preservation of vessels, at least in extending their durability; in the enormous sum involved in the construction, and composing the naval and commercial marine of the world at this time, and the important question here presents itself: What will be the value to nations and individuals in the construction of naval and other steamers, in their cost and repair, and of vessels and steam-engines, in the production of such a remedy?

In order to accomplish these purposes, the undersigned has formed a combination of simple materials, nevertheless proved to possess the most extraordinary properties, not only in effecting these objects, but in their nature so particularly calculated to act as a preservative. The great difficulty was to find anything which would sufficiently adhere to the boiler surface, under the combined action of fire, boiling water, and steam, and which has never before been effected.

The first difficulty was to find the materials (by laborious research and experiment) that would accomplish these purposes; the second, to find the



proportions to produce the effect ; the third, as to the mode of application to steam-boilers and to ship-building.

In order to protect the boiler, a coating of the composition is placed with great facility over its interior surface, with a brush, (or applied to *tubular* boilers with a swab,) and which should be renewed every two or three weeks ; the coating is applied warm in a liquid state, but instantly hardens when the water may be let in the boiler ; under the action of heat, this composition assumes a semi-liquid form, while the coating arrests the corrosion or oxidation of the boiler, it receives upon its surface any deposit or scale that makes, and prevents its attaching itself to the boiler surface, so that such formation or scale can be easily and speedily removed, without the use of chisels or picks, by a simple scraper or wire-brush, leaving the surface of the boiler perfectly clean and uninjured. Indeed, so effectual has the composition proved, as the certificates herewith establish, that it not only has destroyed scale or incrustation which had previously formed, but also, it has even rejected or cast off the incrustation when forming, which has in quantities been found in the bottom of the boiler. It has also been tried upon the exterior of boilers and tubes, and so adheres that it promises to a great extent to protect them from the effect of fire heat and burning. Its application will also commend itself particularly to the water-spaces, next to the furnace or fire-box, where such rapid destruction takes place from the heat, and the formation of scale ; also upon the condensers, pumps, pump-rods, supply and steam-pipes to the bed-plates, fastenings and attachments, ash-pans, &c.

In a series of experiments made by the Navy Department upon steam-boilers, in which both salt and fresh water was used, the reports of engineers herewith show the composition completely successful ; during the longest period tried, "twenty-eight days," while in the most limited period, "four days," its action was such upon the scale, that the boilers could in every instance be immediately cleaned by the use of a *simple scraper only*, instead of the retarded labor with chisels and picks ; subsequent experiments have fully and conclusively confirmed these results, as shown and hereunto annexed.

*One great consideration has been to produce something to protect the boiler, and as far as possible to preserve it in its original state of strength and thickness, by keeping it coated with a material that possesses extraordinary adhesiveness, exposed to the action of fire, boiling water, and steam, yet is so easily removed with a scraper and brush, and this preservation of the boiler, will be admitted certainly to be by far the most reasonable method of preventing explosions, and the dreadful destruction of human life.* Besides this, if explosion from the formation of hydrogen gas, as alleged, is well founded, coating the boiler with the composition will cut off the oxygen, indispensable to its combustion, while also it will go far to prevent the boiler plates from becoming red-hot—and the formation of hydrogen gas, from water thrown upon a red-hot surface—and also explosion caused by the formation, and the cracking of scale, or incrustation, as hereinbefore mentioned.

In order to show that the use of the Compound will in many cases cost nothing in fact, but on the contrary be a gain to those who apply it, besides preserving the boiler, it may be stated in proof, that in one instance, at the Navy-Yard at Brooklyn, about three dollars worth of the composition saved about twenty dollars worth of labor, thus : Two cylinder boilers were about to be coated ; two men were employed nearly two days in chipping off



about six feet in length of the scale which had previously formed on one of the boilers, when it was determined to apply the Compound on the part cleaned, as well as that remaining incrustated; after working the engine for "four days," the action of the Compound was such that the part previously cleaned was divested of the scale with a mere wire-brush, and that not cleaned by the use of a simple scraper only, where so much labor had been previously expended in only partially removing the incrustation to the extent mentioned. At this rate it is seen that the saving of labor would pay the cost of the composition over and over again, besides preserving the boiler.

In factories where the hands and so much capital must stand idle while the boilers are cleaning, repairing, or replacing, when the boiler may be preserved, and so easily and speedily cleaned, so that the work may proceed without loss of time or interruption, it must be of great importance; thus, instead of taking a day or two every two or three weeks to pick and clean boilers, if let to "cool down" on Saturday evening, they may be cleaned and coated at an early hour on Monday morning, and the work proceed without interruption.

Also in ocean steamers, the boilers of which require so much labor, loss of time, and expense, the facility of cleaning the boilers at any stopping place, so that they may proceed with clean boilers, be enabled to keep up speed and steam, save fuel, quicken the passage, and save their boilers, without forcing steam through accumulating scale or incrustation, and particularly in the preservation of the boilers, so that they may not give out abroad, where they can neither be repaired or replaced, and in view of their immense cost, must make it invaluable for ocean steamers. Thus, the engineers of steamers which now run from St. Francisco to Panama, and return with incrustated boilers, may at Panama, or any other convenient stopping place, clean their boilers, and thereby quicken the passage, and save fuel. So on distant voyages in the Mediterranean, for Doctor Lardner says, "even the run from Malta to Alexandria or Scanderoon, is liable to objection, from the liability of the boiler to deposit and incrustation, unless some effectual method be taken to remove this source of injury," for "blowing off" has only been partially successful, even where the greatest vigilance has been exercised.

With regard to the application of the composition to ship-building, it is designed to be placed upon the bolts and fastenings generally, to coat the metallic fastenings thoroughly with it, to apply it in the bolt holes, and to rub it well into the wood where the bolt is to be driven, so as to cut off the action of the acid of the wood upon the fastenings, and the action of the metal upon the wood or timbers of the ship, thereby saving both the timbers and the fastening from corrosion and destruction. Also to apply it to the scarfs and joints wherever two or more pieces come together, upon and between the surfaces, and wherever early decay takes place—upon the transom pieces, and their inner surfaces, breast hooks, dead wood, knees, and about the timber heads, water ways, &c.—as it will make complete air and water tight joints; and it also can be applied over the heads of the fastenings and preserve the ship from iron rust—to the pumps, or pump rods, spears and bands—to the iron knees or braces—and between these and the wood—and in the mode of application, upon the bolts and bolt holes, it will be found to attach itself to the bolts after being driven.



From experiments made at the Navy-Yard, New York, and continued for several months, to test the efficacy of the Compound as an anti-corrosive, and as to its application to ship-building, a plank was suspended with iron bars attached to it, coated with the composition, so as to be exposed to the action of the salt water and atmosphere daily, as the tide ebbed and flowed; from the results of these experiments, and others in brine, and upon coated bolts driven in oak timber for at least two years past, it is believed that at trivial cost, the ship may be preserved in her fastenings and timbers, for an extended period of time, and that it is well worthy of the consideration of underwriters and ship-owners.

Thus while the composition is well calculated, as shown, to preserve the ship, it also in the preservation of the boilers is calculated to go far in extending ocean navigation, and the use of the steam-engine, otherwise, to every purpose to which it is applicable, in its almost illimitable and inexhaustible bounds. It is so perfectly simple in its application; requires no expensive preparation; takes up no room in the vessel, and is applicable to every description of boiler; and everybody conversant with the steam-engine knows that the destruction of the boiler is inevitable without something to produce these effects; and that, by all means, every boiler should be so arranged that it can be got at, and so that it can be thoroughly examined and cleaned, and that without such arrangement no boiler is safe, while its rapid destruction is inevitable. In marine boilers particular regard should be had to such arrangement of the flues, or by leaving out a row or two of tubes, where they run horizontally, for the depth of the boiler in the centre thereof, and placing the tubes in direct lines, so as to admit a person to apply the Compound, and remove the scale, while the boiler could thus be preserved from injury in all its parts; there is no doubt that by keeping the flues or tubes clean, (even at a sacrifice of the requisite space,) that an increase of power and speed would result, and a saving of fuel be effected; the stay-rods might be placed in direct lines, so that not only the crown of the boiler could be protected, but also the rods themselves coated without difficulty. The composition will wholly dispense with the use of copper boilers; and as *every boiler*, whether it makes incrustation or not, *must corrode*, and receive upon its surface, from the evaporation of the water, the particles otherwise held in suspension, so destructive to the metal, its application as a preservative, and in view of saving human life, must recommend itself in every instance.

In the recent cases of explosion on the Delaware and Hudson rivers, the jury report both to have occurred "from the corrosion of the boiler," and of the former, they say "an examination of the iron that gave way shows it to have been reduced to a mere wafer by actual wear and corrosion;" a simple combination that will arrest this destruction, must become of inestimable value to the country and world at large.

It is also applicable to iron vessels, both as a preservative and to prevent the adhesion of marine substances to the vessel, also gas and water pipes, water tanks, bouys, and iron casks, to iron, copper, or wooden sheathing, to the tubes of locomotives, to prevent their injury by heat or incrustation, and about the fire-boxes, to stop leakage of tubes or boilers, to fill up flaws, and to keep the boiler tight, also to docks, wharves, foundation bolts, gun carriages, railroads, heaters and furnaces, and their pipes, canal locks, &c.

From what is here submitted, founded upon the practical result of experi-



ments made upon numerous stationary and marine boilers, and their appendages, as well as upon iron submerged in salt water, as the annexed certificates evince, it seems well established—

*First*, That all steam-boilers may be preserved and protected from the adhesion of scale or incrustation or deposite, and from what is equally fatal and destructive to the boiler, namely, rust or corrosion, by this simple application, besides the preservation of the boiler, the saving of fuel, cost of repairs, detention, and the dreadful destruction of human life, and thus that the steam-engine can be divested of some of the greatest difficulties which has hitherto attended its use and employment.

*Secondly*, As regards ship-building, that by coating the bolts, bolt-holes, and surfaces, of the timbers and joints, wherever desired, that vessels may be preserved for an extended period from decay, and the effects of corrosion, and the action of the corrosion on the timbers, and the destruction of both life and property thereby avoided.

Here is a simple remedy, which, nevertheless, promises to produce incalculable benefits upon two of the most important interests of the world—that of the steam-engine, and ship-building; as regards the steam-engine, whilst it will wholly dispense with the use of copper boilers, it will, in the preservation of those of iron from rapid destruction, remove one of the most formidable barriers to its employment, and induce its use to be extended to every purpose to which it is applicable, while it will undoubtedly save engineers a large portion of their most severe labor in cleaning their boilers.

In support of what is herein set forth the undersigned, in conclusion, begs reference to the subjoined certificates of the experiments which have been made to test the efficacy of the composition, before offering it for sale, and bringing it before the public; and thus supported by these experiments, he feels assured, that notwithstanding the great importance of the subject, and the vast interests involved, that *his simple remedy* will stand the test of time, for every purpose to which it is applicable, as thus developed.

CHARLES FRASER SIBBALD.

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The following reports and certificates will establish the efficacy of the composition, for the purpose as herein set forth. The difference of time between the date of the first and last has been occupied in making experiments and obtaining the patents :

#### SIBBALD'S "METALLINE COMPOUND."

*Copy of reports of United State's engineers as communicated to the Bureau of Construction, Equipments, and Repair, of the Navy Department of the United States.*

"NAVY YARD, NEW YORK, *May* 11, 1850.

"SIR: In compliance with your order of the 5th of March last, we have applied and experimented with the composition 'for preventing the adhesion of deposite upon, and the preservation of steam-boilers,' and beg leave to report:

"The composition was first applied to the boilers of one of the engines at the dry-dock, and the boilers were used for about four days; subsequently

the boilers were cleaned, the composition again applied, the boilers put in use *night* and day for about four days.

"As the duration of these trials was considered entirely too limited to test the efficacy of the composition, it was determined to make a third trial, which was done by applying the composition to the boiler of the yard pumping engine at the water tank; the boiler was closed and continued to work for about twenty-eight days, when it was opened, examined, and cleaned.

The result of these experiments has been briefly as follows:

"It appears to be not only very effectual in preventing the adhesion of deposite when forming, but also to a very great degree loosens deposite already formed and adhering to the metal.

"So effectual has the composition proved in the experiments mentioned, that the deposite was easily removed by a simple scraper, whereas it has formerly been necessary to make use of sharp instruments to pick it off, occupying a much greater length of time.

"In conclusion, we would state that we consider this matter worthy of attention, and would respectfully recommend that a more extended and thorough trial be made upon the boilers of some one of the naval steamers.

"We remain, sir, very respectfully, &c.,

"CHAS. W. COPELAND,  
"JOHN FARON, Sr.

"Capt. WM. D. SALTER,

"*Commander, Navy Yard New York.*"

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"WASHINGTON CITY, *May* 24, 1850.

"The Bureau of Construction, Equipment, and Repairs, of the Navy Department, directed the application of Sibbald's Metalline Compound for the preservation of steam-boilers, to be experimented upon at the Navy Yard, Brooklyn. After three separate trials of 3, 7, and 28 days, the engineers to whom the experiments were confided reported so favorably of the probable utility of it, that I have recommended the application of it in two of the naval steamers, with the view of deriving benefit from its use, and of affording means for a decisive test of its merits.

"CHAS. H. HASWELL,  
"Engineer in Chief, U. S. N."

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The department concluded to have the experiments continued at New York, as the following will evince:

*Experiments continued at the Navy Yard, Brooklyn, pursuant to orders of the Navy Department.*

"PHILADELPHIA, *June* 7, 1850.

"DEAR SIR: I have just received a letter from my son, Dr. Parrish, in New York; he has made another experiment under *special* attention, as I requested, and writes as follows:

"The boiler of the engine in the blacksmith shop at the Navy Yard was opened according to agreement yesterday, and the results of the experiment



were favorable in the highest degree. In this boiler lime stone water had been used six weeks, previous to the 20th of May, when it was opened for the purpose of applying the Metalline Compound.

"The bottom of the boiler to the water line, was found to be coated with a hard stony deposite, which the engineer in charge said could not be removed without a pick. The whole of the deposite (with the exception of a small space about six inches square which was picked off clean) was allowed to remain as we found it—*over* this the Compound was applied, and the boiler again closed and filled; this was early on the morning of the 20th of May. Yesterday morning, 3d of June, the boiler was re-opened, and the whole of the deposite was found to come off with the use of the scaper only. The pick was not required at all. The deposite came off principally in scales, incorporated with the Compound. The small surface that had been cleaned of the deposite previous to the application of the Compound, the engineer pronounced to be cleaner than it was at the time of the application. (Be pleased to show this to Commodore Skinner, &c.)

"Very truly, &c.,

"R. A. PARRISH.

"CHARLES F. SIBBALD, Esq."

*Report of experiment made at the Navy Yard, Brooklyn, New York, with the view of testing the efficacy of the composition in ship-building, by placing the Compound on iron, submerged in salt water.*

"PHILADELPHIA, July 31, 1850.

"DEAR SIR: The timber with three pieces of iron suspended, *on the 11th of March last*, was taken up and examined in the office of Mr. Hart, naval constructor, and also in the presence of Mr. Faron, engineer, and Mr. Holloch, carpenter, *on the 30th July*. One of the pieces of iron, as you are aware, was put on without the Compound, the second with \* \* mixed with the Compound, the third with the Compound alone.

"The first was rusted all over, and the wood injured and colored; the second slightly rusted on parts of the iron, the third *with the Compound alone*; *both iron and wood were in perfect preservation.*

"Very truly, &c.,

"ROBERT A. PARRISH.

"CHARLES F. SIBBALD, Esq."

The experiments it is seen were extended to nearly five months duration. Subsequent experiments were made in brine; and by driving inch bolts (which were coated) in oak timber, also coating the bolt holes, and which coating has proved effectual for upwards of two years past, it cuts off all action between the bolts and timber, and acts as a preservative of both.

*Extract of a letter from Joseph Hoxie, Esq.*

"NEW YORK, September 5, 1852.

"DEAR SIR: I witnessed yesterday morning, at 7 o'clock, a. m., at Jersey city, what I consider the perfect trial of the Compound, the result far

exceeded my most sanguine expectations. Scales had been formed about as thick as a quarter-dollar, and very hard, but so completely had the composition prevented the adhesion to the metal, that the scales had fallen off, and a considerable quantity were deposited at the bottom of the boiler, which were taken out by handfulls. I have no longer any doubts of its great importance.

"Yours truly,

"JOSEPH HOXIE.

"CHARLES F. SIBBALD, Esq."

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"HOPE MILLS, JERSEY CITY, *October 11, 1852.*

"I hereby certify that I have applied 'Sibbald's Metalline Compound' to one of the boilers in the mills, to test the design of the Compound. I found by coating the boiler with the Compound, it prevents the scale from adhering to the boilers, and also caused the scale on the boilers to lose its strong attachment to the iron, and a good part of the scale to slide to the bottom in large pieces, on opening the boilers after three weeks constant use from the time of coating. I also found the other boiler I had not coated, hard and strongly attached to the iron, so that a pick and chisel would not easily remove the scale. I now have Compound on both boilers, as they can be cleaned easily and without injury to the boilers and loss of time. I think it a valuable Compound, that has long been wanted, and am satisfied of its usefulness on application.

"H. W. YERRINGTON, *Engineer.*"

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"JOHNSON & SANFORD'S STEAM-ENGINE,

"BROOKLYN, *October 19, 1852.*

"I have applied Sibbald's Metalline Compound to the boiler of this factory.

"The boiler was coated with it; the coating prevents the scale from attaching itself, and also prevents the iron from rusting.

"The boiler was easily cleaned without chisels, where it formerly has taken much time and labor, with chisels and picks, which are injurious to the boiler. On the whole, I am of the opinion that this Compound is what has been much wanted to save boilers from being destroyed, from both rust and deposite or scale, (large quantities of which had slid to the bottom of the boiler,) and I recommend its application to steam-boilers generally.

"PATRICK LEO, *Engineer.*"

"We coincide in the opinion expressed above, and shall order the Compound for two new boilers in our new establishment as soon as completed.

"JOHNSON & SANFORD, *Owners.*"

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"NEW YORK, *November 5, 1852.*

"DEAR SIR: I have not been able to make an examination of the boilers of the Georgia, so as to form an opinion of the effects of Sibbald's Metalline Compound, which was applied to them previous to her last voyage. On



the termination of her present voyage I design to do so, and will give you the result of my observation. Its effects on the ash-pans are quite satisfactory, and proves most decidedly its great value in preserving the iron, and saving time and trouble hitherto taken to clean them, and when cleaned the iron was in a good state of preservation.

"From the tests I have made, I do not hesitate to say that the Compound will prove invaluable in preventing the corrosion of iron.

"Very respectfully, your obedient servant,

"W. B. SKIDMORE,  
"Engineer of the Steamer Georgia."

"N. B.—The very short time the steamer remains in port is the reason I have not been able to make the examination of her boilers.

"The steamer sails to-day."

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"NEW YORK, November 12, 1852.

"I hereby certify that Sibbald's Metalline Compound for the preservation of steam-boilers, &c., was applied to one of the boilers in the steam-ship under my charge, ('The Star of the West.') I observed that much of the scale, heretofore requiring picks and chisels to remove, had fallen off in large flakes and remained loose in the bottom of the boiler, and was readily taken out without the use of picks or chisels, and the iron of the boiler remained in good preservation.

"ALLEN STEDWELL,  
"Engineer of the 'Star of the West.'"

The composition was applied to the boilers of this steam-ship on the 14th of September last, since when she has made two trips from New York to St. Juan, and was at sea thirty-eight or forty days and nights.

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"PHILADELPHIA, November 23, 1852.

"DEAR SIR: In reply to your inquiry as contained in your letter of the 27th instant, I have great pleasure in stating that, for some time past, I have witnessed many experiments with your 'Metalline Compound,' designed for the preservation of steam-boilers, and also for the preservation of the metallic fastenings and timbers of vessels where they are brought in contact.

"The first series of these experiments were made at the United States Navy-Yard at Brooklyn, New York, by order of the Navy Department, and was continued several months; the Compound was applied to the boilers of several engines at that yard, which were then worked for various periods, of which the longest was twenty-eight days. It was applied both to boilers that were already incrustated, and to those which were clean, of which some consumed salt water, and some fresh.

"With the further view of testing the efficacy of the Compound, as a preservative of wood and iron, (the contact of which is usually so productive of corrosion,) I witnessed its application to bolts and bars secured to an oaken plank, and so suspended in salt water as to suffer exposure to the air at every fall of the tide. This situation was considered to be as trying as any that could be devised, and the experiment was extended to a period of nearly five months. I have also subsequently witnessed its application to the boilers of sea-going vessels, as well as those of stationary engines; in all



these cases the results were successful. It uniformly operates as follows: The Compound is put on the surface of the boiler, the scale or concretion forms over, or deposits on it, and prevents its attaching itself to the iron, and the whole is rapidly and effectively removed, leaving the iron free from rust and uninjured.

"The action of the Compound not only prevents the adhesion of the scale, but oftentimes caused it to become detached, and to accumulate in considerable quantities upon the bottom of the boiler. Boilers to which it had been applied did not require picks and chisels, but could be easily and speedily cleaned by the aid of a mere scraper and brush.

"The bolts and bars which were coated with the Compound as above stated, (in order to test the efficacy in ship-building,) were found to be entirely exempt from rust, whilst those fastened to the same plank that had not been coated were incrustated with rust in heavy scales. The wood also in both instances bore evidence of the marked preservative power of the Compound. In the first place remaining firm and not discolored, and in the second giving manifestations of the usual decay.

"On the faith therefore of these experiments, I do not hesitate to say that this invention will be hailed as one of immense value, as it supplies a want which has been long and deeply felt, and one which the vast amount of capital employed in steam purposes has long sought in vain. In the purposes it aims at, it stands without a rival, (and altogether apart from its great utility in ship-building,) adds so much to the safety and durability of steam-boilers, that to this department of industry it must hereafter be regarded as absolutely indispensable.

"Very respectfully, &c.,

"R. A. PARRISH."

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"NEW YORK, *December 23, 1852.*

"I have tried the composition—'Sibbald's Metalline Compound'—on the ash-pans of the boilers of the steam-ship Arctic, and found it to work admirably; much difficulty has been heretofore experienced in removing the salt and incrustations incident to small leaks, &c., but the application of the Compound obviates the difficulty. Arriving at Liverpool, the deposits formed were removed without trouble by means of a hand-scraper. I am decidedly of opinion that 'Sibbald's Metalline Compound' is a valuable auxiliary for the preservation of the material and saving time, and commend its use wherever it can be applied.

J. B. KERSTED,

"*Chief Engineer of U. S. Mail Steamer Arctic.*"

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"U. S. MAIL STEAMER GEORGIA, NEW YORK, *April 2, 1853.*

"DEAR SIR: I have applied 'Sibbald's Metalline Compound' to the boilers of this steamer with complete success. *Two months* after the application, I found that the scale was easily removed with brush and scraper, without the aid of the chisels and picks, which are always injurious to the boilers.

"Of all the inventions with which I am acquainted for the purpose of preventing the adhesion of scale to the boilers, Mr. Sibbald's is decidedly the best, and I am anxious to procure a further supply immediately.

"Very respectfully, your obedient servant,

"WM. B. SKIDMORE, *Chief Engineer.*

"To JOSEPH HOXIE, Esq."



The Navy Department has contracted for the immediate delivery of fifteen thousand pounds for the United States steam-ships Princeton, Alleghany, and John Hancock, being the estimated quantity for the boilers, ash-pans, &c., of the two former for two years, and the latter for three years supply. It is also applied to the boilers, &c., of various lines of ocean steamers of the mercantile marine, and to stationary engines in the United States Navy-Yards, and elsewhere.

N. B.—The attention of railroad companies is particularly called to the advantages of coating the surface of the iron rail, also the wooden sleepers where they come in contact, and the ties, &c., so as to fill up all cracks and flaws in the sleepers, by coating them after the rail is laid, to exclude as far as possible the moisture, and to prevent corrosion of the rail, and the destruction of the wood where the iron and wood come in contact; the cost will be so trivial, probably less than a cent per lineal foot; also to the application of the Compound to locomotives about the fire-boxes, and on the tubes, or wherever it can be applied.

# SIBBALD'S

## PATENT ANTI-CORROSIVE METALLINE COMPOUND.

Patented in the United States, Great Britain, and for the British Colonies and Europe—for the preservation of steam-boilers from scale or other deposite, oxydation or rust, and to lessen the danger of explosion from these and other causes—also applicable to the fire boxes and ash-pans of Steamers, supply-pipes, pumps, condensers, foundation bolts, bed plates, &c., &c.; also for increasing and extending the durability of the metallic fastenings and timbers of vessels, and in preserving iron vessels from corrosion or the adhesion of marine substances—for copper, iron, or wooden sheathing, to galvanized or water-pipes, water-tanks, wharves and docks, canal-locks, hot-air furnaces, and heaters and the pipes thereof—the boilers of cooking ranges—railroads where the iron is attached to wood—in short to iron in every situation where it is exposed to wet or dampness, or where wood or iron come in contact.

### DIRECTIONS FOR ITS USE.

Melt, or warm sufficient of the Compound until it becomes liquid—calculating about a half pound to nine or ten square feet of surface; keep it well and thoroughly stirred while applying, so that the ingredients shall be kept thoroughly incorporated. On all plain surfaces apply it with a brush similar to a white-wash brush, and to tubes with a mop or swab.

In steam boilers, if any scale forms, it will either form upon the composition, or be cast off by it—while it will completely protect the boilers' surface from its adhesion, also from rust or corrosion. The boiler can be cleaned immediately by the use of a simple scraper and brush, instead of the protracted labor with chisels and picks, so injurious to the boiler; renew the coating every three weeks; the boiler can thus be kept in perfect order.

In ship-building, or for bolts and fastenings, rub it well on the bolt, and into the bolt hole, it will make a complete coating, and cut off the acid of the wood from the bolt, and prevent the destruction of the wood or timber by the action of the metal—place it between the joints or surfaces wherever desired, it will form a complete air and water-tight joint.

N. B.—The boiler should be dried before applying the Compound, and, if warm, it will apply easier—the water may be let in immediately.

### SCALE OF PRICES.

For Ocean Steam-ships, 200 horse-power, and under, for a license for its use per annum	\$125
From 200 to 400 horse power	200
" 400 to 600 " "	300
" 600 to 1,000 " "	375
River Steamers, first class	125
" " second class	100
In ferry boats or tow boats	70
For stationary engines under 20 horse-power, for term of present patent	200
" " 20 " and upwards, (for term of the present patent) per horse power	10
For locomotives per annum	25
For ship-building per ton register, as long as the vessel lasts	1

With these licenses the Composition will be sold at fifteen cents per pound—casks one dollar each. In all cases where a license is not taken, twenty-five cents per pound will invariably be charged, and no charge for casks; but it will not be sold for application in the construction of vessels, without a license.

The Compound will be manufactured in Philadelphia only, to insure that the best quality of ingredients shall be used, and the proper application and incorporation of those ingredients.

It will be prepared in casks of 100 pounds each—a half pound is estimated to coat about nine or ten square feet of surface, or a horse-power.

Letters containing orders and remittances (post paid) will be executed in the order in which they are received—descriptive pamphlets with proofs will be furnished.

Apply to CHARLES F. SIBBALD, No. 63 Dock street Philadelphia.

Or to JOSEPH HOXIE, No. 91 West street New York.

Notice will be given as other agencies are established.